Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Unlicensed Use of the 6 GHz Band	)	ET Docket No. 18-295
	)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz	)	GN Docket No. 17-183
	)	

REPLY COMMENTS OF NOKIA

Nokia respectfully submits these Reply Comments in the above-captioned proceeding[1] to address two discrete issues: (1) proposed additional technical details on the Automated Frequency Coordination (AFC) system; and (2) support for a Further Notice of Proposed Rulemaking (FNPRM) to consider introduction of licensed services in the upper portion of the 6 GHz Band.

I. ADDITIONAL DETAILS ON THE AFC SYSTEM TO PROTECT FIXED LINKS IN THE 6 GHZ BAND

As mentioned in Nokia's Comments,[2] the AFC system can play a central role in protecting fixed links in the 5.925-6.425 GHz (U-NII-5) and 6.525-6.875 GHz (U-NII-7) sub-bands. For the 6.425-6.525 GHz (U-NII-6) and 6.875-7.125 GHz (U-NII-8) sub-bands which have no, or a very limited number of fixed links but have mobile services, restricting the U-NII devices to indoor low power use without an AFC system is acceptable. Nokia still recommends studying if high power operation in U-NII-6 and U-NII-8 is also feasible via an AFC system.

[1] *Unlicensed Use of the 6 GHz Band,* Notice of Proposed Rulemaking, GN docket No. 18-295, *et al.*, FCC 18-147 (rel. Oct. 24, 2018) (*"NPRM").*
[2] Comments of Nokia, ET Docket No. 18-295, GN Docket No. 17-183 (filed Feb. 15, 2019).

The two main design objectives of the AFC are as follows:

(1) Guaranteeing much needed protection to existing and potentially future incumbent usage in the form of Fixed Link (FL) wireless systems that provide critical backhaul service to commercial cellular networks – specifically in the U-NII-5 and U-NII-7 bands; and

(2) Providing rapid access to U-NII-5 and UN-II-7 spectrum for new shared indoor and outdoor use without requiring tedious manual coordination with existing incumbent systems.

To achieve these objectives, the AFC needs full knowledge of the (a) legacy fixed links that need protection; and (b) at a minimum, geo-location of new entities interested in using the spectrum band. We envision that information on existing and any future FL systems will be maintained in a continuously updated FL database (FLDB) that AFC systems can periodically download. The database entries record parameters of FL systems – specifically characteristics of TRXs in the FL links such as geo-location, antenna height, antenna characteristics (e.g., gain, sectorization), maximum power, and frequencies/channels (i.e. portions of U-NII band) used. The Commission's ULS database can be such an FLDB as long as the ULS information is accurate, up-to-date and covers the FL parameters mentioned above.

Some initial details about an AFC can be found in the attached Technical Appendix. However, we continue to recommend that the Commission and/or a group of stakeholders, including the fixed links vendors and users, define the requirements of the AFC system in detail and that the AFC system is tested before it is commercially deployed.

II. THE COMMISSION SHOULD ISSUE AN FNPRM TO CONSIDER LICENSING THE UPPER PORTION OF THE 6 GHZ BAND AND RELOCATING INCUMBENT SERVICES

In its comments, CTIA urges that the Commission move forward with introducing unlicensed services into the lower portion of the 6 GHz band (5.925 GHz to 6.425 GHz), and that

the Commission "promptly issue a further notice of proposed rulemaking to consider licensing the upper portion of the 6 GHz band [6.425-7.125 GHz] for exclusive use, flexible rights services."[3] Nokia fully agrees that a fresh look at the upper 6 GHz band would serve the public interest.

As CTIA argues persuasively -- to date, only 180 MHz of new mid-band spectrum has been identified for licensed terrestrial 5G (from 3.7-3.88 GHz), placing a premium on finding additional candidate bands for the types of high-power licensed services that are the workhorse for 5G. Simply stated, other than the 180 MHz currently under active consideration, the licensed 5G spectrum pipeline in the mid-band has essentially run dry. The upper 6 GHz band offers 700 MHz of spectrum, rivaling 5G spectrum allocations already being implemented in several countries around the globe in the 3 GHz band. Indeed, the U.S. is lagging behind other countries in allocating large blocks of spectrum for licensed 5G. There are currently no proposals on the table for the U.S. that can come close to filling that growing gap.

Of equal importance, CTIA recognizes that such high-power services cannot coexist with in-band incumbent operations and proposes that such incumbents must be relocated and "made whole."[4] Nokia agrees that a prime candidate band for relocation is the 7.125-8.4 GHz band, which is currently allocated for Federal use. However, much technical work and collaboration with Federal stakeholders will be required. Nokia recognizes that such an effort will take years to complete. Such time and rigor will be necessary to complete the technical studies and relocations necessary to truly "make whole" incumbent operations. However, such efforts will be well worth it to provide the high-, mid-, and low-band spectrum blocks necessary

[3] Comments of CTIA, ET Docket No. 18-295, GN Docket No. 17-183, at 9 (filed Feb. 15, 2019).
[4] *Id.* at 10.

to make the promise of 5G a reality throughout the entire U.S., and for the U.S. to continue its leadership in the next generation of wireless technologies.

III. CONCLUSION

As set forth above and in the attached Technical Appendix, Nokia respectfully requests that the Commission consider Nokia's technical inputs regarding the AFC and consider in an FNPRM the feasibility of licensed services in the upper 6 GHz band.

Respectfully submitted,

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